

WHAT IS CLAIMED IS:

1. An ink jet ink composition comprising water, a humectant, and a hyperbranched polymeric dye comprising a hyperbranched polymer having a dye chromophore pendant on the polymer chain or incorporated into the polymer backbone.

2. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore pendant on the polymer chain has the formula:



wherein:

HB is a hyperbranched polymer core;
D is a dye moiety; and
n is an integer of at least 2.

3. The composition of Claim 2 wherein said HB is a polyamide, polyester, polyether, vinylic polymer, polyimine, polysiloxane, polyesteramide or polyurethane.

4. The composition of Claim 2 wherein said HB is prepared by a chain polymerization of a monomer of the formula $M^1-R^1-M^2_m$ wherein (i) R^1 is a linear or branched alkyl, carbonyl, or aromatic moiety; (ii), M^1 and M^2 are reactive groups that react independently of each other in which M^1 is a polymerization group and M^2 is a precursor of a moiety M^{2*} which initiates the polymerization of M^1 as a result of being activated; and (iii), m is an integer of at least 1.

5. The composition of Claim 2 wherein said HB is prepared by a condensation or addition polymerization of a monomer of the formula $M^3-R^2-M^4_p$

wherein (i) R^2 is a linear or branched alkyl or aromatic moiety; (ii), M^3 and M^4 are groups that undergo a condensation or addition reaction; and (iii), p is an integer of at least 2.

5 6. The composition of Claim 2 wherein said HB is prepared by a condensation or addition polymerization of a monomer of the formula $R^2-M^5_q$ and $R^3-M^6_t$, wherein (i) R^2 is as defined above and R^3 is a linear or branched alkyl or aromatic moiety; (ii), M^5 and M^6 are groups that undergo a condensation or addition reaction; and (iii), q is an integer of at least 2 and t an integer of at least

10 3.

7. The composition of Claim 4 wherein M^1 is a non-substituted or substituted vinylic group, M^2 is X, $-CH_2X$ or $-CH(CH_3)X$ wherein X is Cl, Br, I, S-C(=S), YR^4R^5 or $-O-NR^4R^5$, $Y=O$ or N, and R^4 and R^5 are each independently $-(CH_2)_r$ ($r = 1-12$), $-C_6H_5$, $-C(O)O$, or $C(O)$.

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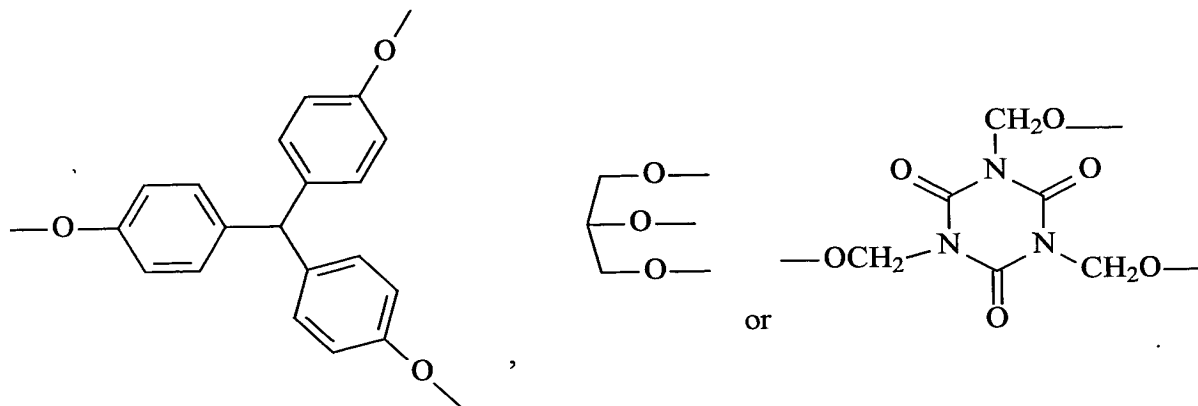
8. The composition of Claim 5 wherein M^3 and M^4 are each independently $-COOH$, $-OH$, $-C(O)Cl$, epoxy, anhydride, NH , or NH_2 , and R^2 is $-C_6H_3-$, or $-(CH_2)_s-C(R^6)-$ wherein R^6 is a linear or branched alkyl or aromatic group and s is an integer of 1-14.

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9. The composition of Claim 6 wherein M^5 and M^6 are each independently $-COOH$, $-OH$, $-C(O)Cl$, epoxy, anhydride, NH or NH_2 , and R^3 is

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$-\text{C}_6\text{H}_4-$, $-\text{C}_6\text{H}_4-\text{O}-\text{C}_6\text{H}_4-$, $-\text{C}_6\text{H}_3$, $\text{N}(\text{CH}_2)_3-$, $-\text{C}_4\text{H}_8-$, $-\text{C}_6\text{H}_{10}-$,



5 10. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the backbone thereof is a polyamide, polyester, polyether, vinylic polymer, polyimine, polyesteramide or polyurethane.

10 11. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the polymer backbone is prepared by a chain polymerization of a monomer of the formula $\text{M}^1-\text{R}^7-\text{M}^2_m$ wherein R^7 is a linear or branched alkyl, carbonyl, or aromatic moiety containing a dye chromophore and M^1 , M^2 and m are defined as in Claim 4.

15 12. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the polymer backbone is prepared by a condensation or addition polymerization of a monomer of the formula $\text{M}^3-\text{R}^7-\text{M}^4_p$ wherein R^7 is defined in Claim 11 and M^3 , M^4 and p are defined as in Claim 5.

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13. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore incorporated into the polymer backbone is prepared by a condensation or addition polymerization of a monomer of the

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formula $R^8-M^5_q$ and $R^9-M^6_t$, wherein R^8 and R^9 are each independently a linear or branched alkyl or aromatic moiety, at least one of which contains a dye chromophore, and M^5 , M^6 , q and t are defined as in Claim 6.

5 14. The composition of Claim 1 wherein said dye chromophore is a mono- or poly-azo dye, basic dye, phthalocyanine dye, methine or polymethine dye, merocyanine dye, azamethine dye, quinophthalone dye, thiazine dye, oxazine dye, anthraquinone or metal-complex dye.

10 15. The composition of Claim 14 wherein said mono- or poly-azo dye is a pyrazoleazoindole.

15 16. The composition of Claim 14 wherein said metal-complex dye is a transition metal complex of an 8-heterocyclylazo-5-hydroxyquinoline.

17. The composition of Claim 1 wherein said humectant is diethylene glycol, glycerol or diethylene glycol monobutylether.

20 18. The composition of Claim 1 wherein said hyperbranched polymeric dye comprises about 0.2 to about 20 % by weight of said ink jet ink composition.

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